



LECTURE BASED MAPPING TOWARDS ACHIEVING EXCELLENCE IN OUTCOME BASED EDUCATION (OBE) FRAMEWORK

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ABSTRACT

OBE concept of education has become so much relevant in present context of industry requirement and other expectations of various stakeholders recruiting our graduates. Particularly, engineering graduates are more required to practise the concept and assess themselves in the framework if the learning goes into appropriate direction to meet achieve the expected outcome. Programme outcomes (POs) are based on extensive contributions due to several factors that are derived from course outcomes (COs); which are further derived from unit and chapter outcomes. This paper recommends few pragmatic approaches of mapping the POs with lecture based ordination that might differ again from topic based concept. The recommendation explicitly describes how each lecture could contribute towards meeting overall PO of a particular programme. The emphasis has been given to engineering and technology based education and its impact on society and development of nation. The way one could develop few skills of employability skills, has also been suggested.

KEYWORDS: OBE, Employability skill, Lecture, Course outcome, Mapping, Excellence, Competence.

1. INTRODUCTION

India has made significant progress in the field of education in last decade across the globe but in proportion to world's population share, she has long way to go to become at par with many countries in the world. Infrastructural expansion in the education sector particularly in higher and technical education is being attempted vibrantly. However, as truly envisaged in OBE concept of education, a lot of things yet to be done that require internal procedural changes; revision of curriculum meeting the current requirement; proactive approach etc [1]. At the same time, India has emerged as powerful player in the field of information technology (IT); in fact the IT growth and its huge applications in the globe is mainly due to the contributions of young and dynamic IT professionals and engineers. Now, OBE is being practiced in many institutes of the country so that it can meet the requirement at global level and its graduates could be accepted anywhere.

OBE talks about outcome of every activity in academic organization that may be research activity; teaching activity; problem and project based activity; each of the activities should contribute some outcome as a change in students. Outcome is culminating exhibition of actual learning in students. Students start their studies with certain objectives in their minds also with certain dreams of their parents and own. OBE framework of education suggests the ways, tools, means by which one can ascertain the outcomes that are mapped with objectives which were set in at the time of starting of the study. Simply producing the graduates or post graduates would serve the purpose, this may merely help them in getting employment but sustainable career growth could not be enjoyed by the candidates if not properly trained through OBE process [2-3]. This requires transitional change in conventional education system although selected number of reputed organizations has started practicing OBE [1].

The goal is to develop competence in students in the form of set of skills which is also called as employability skills so that they can excel in their respective profession and contribute in sustainable growth of the organization. So, the OBE also ensures that the feedback from employers matches with the vision and mission of the institute from where the student has passed out. Effectiveness of technical education lies in several factors such as industry institute interaction and its exposure to students; practicing problem based learning (PBL); realizing the students about importance of values, ethics, societal responsibility and also their role towards the nation [4]. OBE focuses on more student centric concept and less faculty centric approach, at the same time the concept of research centric plays an important role in the OBE framework [5].

There are three important agreements, namely Washington accord (for engineering), Dublin agreement (technologist) and Sidney accords for technician. In almost all, the expectations of the various industries were taken into consideration and also the desired employability skills such as communication skill, strong work ethic, technical aptitude, attitude etc. Then, graduate engineering attributes are compared in ABET criteria clearly identifying the design aspects of engineering and developing the attributes through solving complex engineering problems [6]. The outcomes also referred as program outcomes (Pos) include student learning outcomes as set of course learning outcomes (COs) that is further derived from chapter learning outcomes (LOs). The fact remains unaddressed widely in the technical institutes despite that fact that more than 70 percent engineering graduates are not employable as reported by many research and survey agencies such as NASSCOM. What we require today are innovative, critical and

creative thinkers who could apply their appropriate knowledge in solving real world problems of the society for larger cause and benefit of society and mankind [7-10].

This paper highlights about the simple ways by which an ordinary teacher or faculty can contribute all expected outcomes in our students as envisaged in OBE framework to make India in the list of developed nation when it comes to quality education that is more research based. Few tools are suggested as recommendations towards achieving excellence in the field of technical education by observing OBE religiously.

2. RESEARCH BACKGROUND

Sarkar [1] studied the assessment of education systems in terms of primary enrolment to teaching learning outcome. The assessment of any education system should be based on the true outcome of teaching learning process as an integrated process. The learners need to involve in active learning process and ought to get the opportunity to evaluate themselves if they are moving in right direction or not. "Sarva Shiksha Abhiyan" is the brilliant step towards making all educated that needs reformative steps involving the assessment tools and the environment for mapping between outcome and objective that again needs teacher's training at appropriate level so that they can propagate and impart the suitable amount of assessment oriented education to the children right from childhood and school education. The involvement of different government bodies such as NCTE, AICTE, NCERT, CBSE, ICSE etc. is equally important since they are responsible for policy making and their implementations.

Davis [2] discussed different possible ways in which the outcome in OBE could be achieved. The implementation of OBE was discussed along with advantages and disadvantages thereof. The paper particularly highlighted outcome achievement in context with medical science education, namely effective communication; basic clinical sciences and their knowledge; use of basic sciences in the practice of medicine; knowledge of diagnosis, management, and prevention; lifelong learning; self-awareness, self-care, and personal growth; social and community perspective of healthcare; moral reasoning and clinical ethics; problem solving based approaches to real time situations and challenges etc. The concept of OBE discussed in this paper is equally applicable to all sectors of education.

Batra [3] highlighted about impact of teaching learning process to society through interdisciplinary studies. The values are equally important in any education system which helps in empowering the young minds to become future leaders of the nation. The aim of the new concept of learning should be developing citizenship and democratic values in students. Educational change in institutional patterns may require keeping regularly updated to keep pace with the ongoing and changing demands of the industry and the societal needs. The contemporary curriculum needs to be revisited on regular basis for the same. Classroom practice and subsequent learning is shaped by the sub-culture and social ethos of teacher education. The argument about more robust epistemological underpinnings in designing teacher education programmes has been also underlined in this paper. A new pedagogic imagination way of learning style could of great help in achieving involvement in social activity and teaching as social practice.

Wadhwa et al. [4] stressed on various types of skills required in 21st century workforce and students, such as technical skills, soft skills and life-long learning

skills. World Bank reports suggest that engineers must possess core employability skills, communication skills and professional skills apart from the conventional technical and academic skills. Activity based learning (ABL) makes their productivity increased through the active involvement in various activities that give them the opportunity in developing the skill set. The Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC of ABET) came with new criteria that identify activity-based learning as an important aspect or factor of engineering technology programs. ABL empowers the students with fundamental concepts and knowledge; and apply the learning experience in solving industry based real world problems for larger benefit of the society. Improved communication, creativity, social skills and leadership skills are very important to be there in students to excel in their profession and enjoy sustainable growth in their respective career.

Rashid [5] underlined the role of the advancement of technology in the engineering functions and markets that are continuously changing. The ICT based technology enabled education should meet the requirement of global market place so that engineers can work and interact with people of different nationalities and can have cross-cultural understanding. The student learning outcomes are to be seriously designed keeping in mind about the graduate engineering attributes as underlined and suggested in the ABET criteria.

India has always enjoyed respect at international level due to its Vedic and holistic way of education system incorporating values, yoga and other essence of spirituality in it. The principal aim of education in ancient India was not knowledge for just money making but beyond this, for complete realization of the self. The ancient Gurukul system fostered a bond between the Guru and the Shishya (teacher and taught) and always stressed a teacher centric system in which the pupil was subjected to a rigid discipline. The OBE was practiced up to great extent those days. Now, the same is required to be practiced again with new area of knowledge gain mechanisms and advent of technology. Many Indian scholars like Charaka, Aryabhata, Chanakya, Patanjali and Vatsayana contributed to great extent in seminal contribution to the world knowledge. The education policy, the National Policy on Education 1986 (revised in 1992) envisaged the system of education that aimed at education for all irrespective of caste, creed, location or sex, and equal access to all [6].

Reddy et al. [7] reported the role of engineers & technologists in our social development, economic progress, and enhancement of social and physical infrastructure. The engineering graduates and researchers are responsible in the society to understand the technological complexities and apply creative skills to industrial and business world. Team based activities were specially stressed upon to develop leadership skill in students so that they could lead the giant industries and can contribute also in few important corporate social responsibility (CSR). The ambience for learning is to be encouraged among students and this has to be made more student-centric so that they get more opportunity in integrative environment of learning.

Rajesh et al. [8] studied about employability skills required in students to survive in changing global market. It discussed few survey reports that highlighted that 25 percent or even less percentage of engineering graduates are actually employable. The paper studies the need for different type of higher education in India and the effective implementation of OBE which is a challenging task. The OBE has all potential to bring big changes in the educational institutes and students ultimately to improve the teaching and learning processes.

Right to education (RTE) act enables the children for educating them all and giving the children equal opportunity but the quality of education and impact assessment are very important while implementing the educating for all. Outcomes of education system should be knowledge, skills and attitudes right from primary education and which requires this to be linked with national goals for education and benefit of the society [9]. The important issues regarding learning human rights and values, their practice, and many more are required to be imparted even in formal education at all levels [10].

3. RESEARCH CHALLENGES AHEAD

The concept of OBE is appreciated by all but when practiced then no any robust approach could be found. The approach may not be robust also but a general framework must be envisaged so that requirement for global market keeping in view of ethical values and human dimension of design and implementation.

An extensive literature review in the field of OBE suggests that pragmatic ways of practicing OBE and targeting bigger goals to achieve the POs have been not clearly articulated. Few challenges that could be taken as research problem for clear recommendations to practically implementing OBE are:

- Attitudinal change requirement and its adverse impact otherwise, not reported;
- Activity based learning and its impact on POs and their achievement;
- Smaller activities delivered in all lectures and how do they contribute in actual learning process to meet any one of the requirement towards ABET guidelines; and

- Research based approach associated with lecture based learning paradigm.

4. PROPOSED METHOD AND RECOMMENDATION

Let us begin with POs which are prepared taking vision and mission of the institutes. Programme education objectives (PEOs) are also framed in accordance with vision and mission but the vision and mission should meet and follow the criteria and graduate attributes of ABET.

In fact, in simple words PEOs are kind of dream statements one sees based on the vision and mission of the institutes; and POs are true dreams one plans and to achieve after certain duration of study.

Let PO be expressed as:

$$\text{Pos} = \text{set of (COs)} \quad (1)$$

where, COs are course outcomes, since many courses are delivered in any programme; it may undergraduate course or post graduate course.

Now, COs are derived from several outcomes through different activities, such:

$$\text{Cos} = \text{set of (TOs, LOs, PJOs, LBOs, SOs, GDOs, ECAOs, CCAOs)} \quad (2)$$

where, TOs, topic outcomes; LOs, lecture outcomes; PJOs, project outcomes; LBOs, lab based outcomes; SOs, seminar outcomes; GDOs, group discussion outcomes; ECAO, extra-curricular outcomes; and CCAOs, co-curricular activity outcomes.

From equation (2) it is evident that there are number of activities and components of COs, but a common factor remains there is all is lecture. Even it is seminar, or group discussion; be it project or problem based learning; be it co-curricular activity based components, in almost all invariably, lectures plays most significant role towards COs. The lecture may be required in few of the components as a part of orientation, induction, motivation, outline and so on because goal setting, agenda throwing, and description of objectives and learning outcomes among students need some form of lecture by any appropriate faculty member.

Lecture helps a lot in making students motivated so that we could help then in achieving their all expected outcomes as envisaged in COs and finally Pos.

Any lecture can have few important components, irrespective of subjects, such as:

$$\text{Lecture (L)} = \text{combination of (OL, OR, MT, IMP, ES, CSP, FOP, DOP, MATH, ANL, APPL, CON, RELV)} \quad (3)$$

where, OL, outline; OR, orientation; MT, motivation; IMP, importance; ES, essence; CSP, concept; FOP, formulation of problem; DOP, description of the problem; MATH mathematical background; ANL, analysis; APPL, application; CON, conclusion; and RELV, relevance.

The above components may contribute towards COs in linear and non-linear manner.

Therefore, it is recommended that the lecture could be utilized in following different ways:

- Each lecture should be initiated properly with appropriate outline of the lecture for a particular topic, its role in the topic and how it is relevant to previous lectures and topics. This would enable the students to correlate the contents and get inference;
- A suitable example, if possible should be given for each topic, rather each lecture to make students easily understand and motivate them. This could help creating interest and zeal towards learning;
- The lecture must highlight the basic concept or fundamental of the essence of delivery. This would help in developing problem based learning and conceptual approach of comprehension;
- What problems could be formulated; questions would be raised; and viable solutions; etc must be suggested to the students in interactive manner;
- The problems formulated should be described using appropriate usage of mathematical background, wherever applicable. This would help developing critical thinking skills in students; and
- Each lecture should be concluded properly in addition to discussion about its applications and relevance to the subject and the course which the student is undergoing.

5. CONCLUSIONS AND FUTURE WORK

This paper has attempted in suggesting few practical ways of achieving expected POs towards excellence in education, especially technical education. Knowl-

edge gain is important but the hunger of learning and developing competence is equally important. This could be achieved through lecture based mapping with POs, objectives keeping in mind. Lectures carry huge potential or scope for practicing the concept of OBE and make the country as developed nation. Lesson based and lectured based approaches have been clearly underlined how they could help meeting the global market requirement. Future work aims at working towards each component exclusively and extensively with appropriate case studies and examples.

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